CLAIMS

1. Ionization source device, for ionizing analytes in liquid phase, to be further analyzed by mass spectrometry, comprising

(a) an inlet assembly (11) for introducing, vaporizing and heating the analyte solution into the ionization source;

(b) an ionization chamber (3) in fluid communication with said inlet assembly (11), the said ionization chamber (3) being provided with an outlet orifice for communicating between the ionization chamber (3) and the analyzer or filter of the mass spectrometer, characterized in that

the said ionization chamber (3) comprises a plate (4) having at least one active surface (4') which faces the internal aperture of the inlet assembly (11), the said active surface (4') being electrically charged or polarized.

2. The ionization source device of claim 1, wherein the said active surface (4') is charged by connection with power supply means.

3. The ionization source device of claim 1, wherein the said active surface (4') is polarized by induction.

4. The ionization source device according to any

one of claims from 1 to 3, wherein the said plate (4) and the said at least one active surface (4') are made of an electrically conductive material.

5. The ionization source device according to claim 4, wherein the said electrically conductive material is chosen between iron, steel, gold, copper or platinum.

6. The ionization source device according to claim 4, wherein the said plate (4) is coated with a non-conductive material to form the said at least one active surface (4').

7. The ionization source device according to claim 6, wherein the said non-conductive material is chosen between a silica or silicate derivative such as glass or quartz or a polymeric material such as PTFE.

8. The ionization source device according to any one of claims from 1 to 7, wherein the said at least one active surface (4') is provided with corrugations.

9. The ionization source device according to claim 8, wherein said corrugations are point-shaped corrugations.

10. The ionization source device according to any one of claims from 1 to 9, wherein the said plate (4) is inclined of an angle which allows the ionized analyte to be reflected towards the analyzer of the mass

spectrometer.

11. The ionization source device according to claim 10, wherein the said angle is 45° when the angle between the axes of both the inlet assembly (11) and the outlet orifice is 90°.

12. The ionization source device according to any one of claims from1 to 11, wherein the plate (4) is 0.05 to 1 mm thick, preferably 0.1 to 0.5 mm thick.

13. The ionization source device according to any one of claims from 1 to 12, wherein the said plate (4) is linked, through connecting means (5), to a handling means (6) that allows the movement of the said plate (4) in all directions.

14. The ionization source device according to claim 13, wherein the said connecting means (5) are made of an electrically conductive material.

15. The ionization source device according to claim 13 or to claim 14, wherein the said connecting means (5) are step-like shaped.

16. The ionization source device according to any one of claims from 1 to15, wherein the said plate (4) is connected to power supply means (20).

17. The ionization source device according to any one of claims from 1 to 16, wherein the said inlet assembly (11) comprises an inlet hole (10) for feeding

the analyte solution and an internal duct in fluid communication with the said inlet hole (10), said internal duct comprising a nebulization region (12) and a heating region (13) and ending into the said ionization chamber (3).

18. The ionization source device according to claim 17, wherein the said nebulization region (12) is in fluid communication with at least one gas lines (14, 15) for nebulizing the analyte solution and carrying it towards the ionization chamber (3).

19. The ionization source device according to claim 18, wherein the said gas is nitrogen.

20. The ionization source device according to any one of claims from 1 to 19, wherein the said heating region comprises heating means, preferably a heating element connected to a power supply connector (16).

21. A mass spectrometer characterized in that it comprises a ionization source device as defined in any one of claims from 1 to 20.

22. The mass spectrometer according to claim 21, further comprising:

(1) a device, preferably a Liquid Chromatograph, for the separation or de-salting of the molecules contained in a sample;

(2) at least one analyzer or filter which separates

the ions according to their mass-to-charge ratio;

(4) a detector that counts the number of the ions;

(5) a data processing system that calculates and plots a mass spectrum of the analyte.

23. A method for ionizing an analyte to be analyzed by means of mass spectrometry, the method comprising the following steps:

(a) dissolving the analyte in a suitable solvent;

(b) injecting the said analyte solution into a ionization source device as described in any one of claims from 1 to 20;

(c) causing the analyte solution to be vaporized and heated;

(d) causing the vaporized and heated analyte solution to impact onto an active surface (4');

(e) causing the ionized analyte to be collected by the analyzer or filter of a mass spectrometer.

24. The method according to claim 23, wherein the analyte is dissolved in a dipolar solvent.

25. The method according to claim 24, wherein the solvent is selected from H_2O, an alcohol such as methanol or ethanol, acetonitrile.

26. The method according to any one of claims from 23 to 25, wherein the impact angle of the vaporized and heated analyte solution onto the active surface (4')

is 45° or less.

27. The method according to any one of claims from 23 to 26, wherein the analyte solution is heated at a temperature chosen in the range of from 200°C and 450°C, preferably of from 250°C and 350°C.

28. The method according to any one of claims from 23 to 27, wherein a potential difference of between 0 and 1000 V, in absolute value, is applied to the said active surface (4').

29. The method according to claim 28, wherein the said potential difference, in absolute value, is of between 0 and 500 V, preferably of between 0 and 200 V.

30. The method according to any one of claims from 23 to 29, wherein the said analyte solution contains further an aminoacid, preferably selected from glycine, lysine, istidine, aspartic acid and glutammic acid.